

Past HSC Questions...



General Maths HSC

NAME: _____

Past HSC questions...

2011 HSC MC

- 16 A loan of \$25 000 is used to purchase a car. The term of the loan is three years and the interest rate is 9% per annum, compounded fortnightly.

Which equation should be used to calculate the fortnightly repayments, M ?

(A) $25\,000 = M \left\{ \frac{(1 + 0.09)^3 - 1}{0.09(1 + 0.09)^3} \right\}$

(B) $25\,000 = M \left\{ \frac{(1 + 0.09)^{78} - 1}{0.09(1 + 0.09)^{78}} \right\}$

(C) $25\,000 = M \left\{ \frac{\left(1 + \frac{0.09}{26}\right)^3 - 1}{\frac{0.09}{26}\left(1 + \frac{0.09}{26}\right)^3} \right\}$

(D) $25\,000 = M \left\{ \frac{\left(1 + \frac{0.09}{26}\right)^{78} - 1}{\frac{0.09}{26}\left(1 + \frac{0.09}{26}\right)^{78}} \right\}$

Q23

- (c) An amount of \$5000 is invested at 10% per annum, compounded six-monthly.

2

Compounded values of \$1

Period	Interest rate per period				
	1%	5%	10%	15%	20%
1	1.010	1.050	1.100	1.150	1.200
2	1.020	1.103	1.210	1.323	1.440
3	1.030	1.158	1.331	1.521	1.728
4	1.041	1.216	1.464	1.750	2.074
5	1.051	1.276	1.611	2.011	2.488
6	1.062	1.340	1.772	2.313	2.986

Use the table to find the value of this investment at the end of three years.

Q27

- (d) Josephine invests \$50 000 for 15 years, at an interest rate of 6% per annum, compounded annually. 4

Emma invests \$500 at the end of each month for 15 years, at an interest rate of 6% per annum, compounded monthly.

Financial gain is defined as the difference between the final value of an investment and the total contributions.

Who will have the better financial gain after 15 years? Justify your answer with suitable calculations. You must show the correct values substituted into appropriate formulas.

2010 HSC

Q25

- (d) Mark needs \$8000 to go on a holiday in three years time. He has a 'Holiday Savings Account' with a balance of \$600. 4

He arranges to deposit \$150 into this account at the end of each month for the next three years.

He earns 6% per annum interest on the money in his account, compounded monthly.

Will Mark have enough money for his trip at the end of three years? Justify your answer with suitable calculations.

2009 HSC MC

- 17 Sally decides to put \$100 per week into her superannuation fund. The interest rate quoted is 8% per annum, compounded weekly.

Which expression will calculate the future value of her superannuation at the end of 35 years?

(A) $100 \left\{ \frac{\left(1 + \frac{0.08}{52}\right)^{35} - 1}{\frac{0.08}{52}} \right\}$

(B) $100 \left\{ \frac{(1 + 0.08)^{35} - 1}{0.08} \right\}$

(C) $100 \left\{ \frac{\left(1 + \frac{0.08}{52}\right)^{1820} - 1}{\frac{0.08}{52}} \right\}$

(D) $100 \left\{ \frac{(1 + 0.08)^{1820} - 1}{0.08} \right\}$

Q26

- (c) Margaret borrowed \$300 000 to buy an apartment. The interest rate is 6% per annum, compounded monthly. The repayments were set by the bank at \$2200 per month for 20 years.

The loan balance sheet shows the interest charged and the balance owing for the first month.

<i>Month</i>	<i>Principal at the start of the month</i>	<i>Monthly interest</i>	<i>Monthly repayment</i>	<i>Balance at end of month</i>
1	\$300 000	\$1500	\$2200	\$299 300
2	\$299 300	<i>A</i>	\$2200	<i>B</i>

- (i) What is the total amount that is to be paid for this loan over the 20 years? **1**
- (ii) Find the values of *A* and *B*. **2**
- (iii) Margaret knows that she can check the bank's calculations by using the present value of an annuity formula to calculate the monthly repayment.
- (1) Write down the present value of an annuity formula with the correct substitutions for this home loan. **1**
- (2) Use this formula to find the calculated monthly repayment. **1**

Q27

- (a) The table shows the future value of a \$1 annuity at different interest rates over different numbers of time periods.

Future values of a \$1 annuity

<i>Time Period</i>	<i>Interest rate</i>				
	<i>1%</i>	<i>2%</i>	<i>3%</i>	<i>4%</i>	<i>5%</i>
1	1.0000	1.0000	1.0000	1.0000	1.0000
2	2.0100	2.0200	2.0300	2.0400	2.0500
3	3.0301	3.0604	3.0909	3.1216	3.1525
4	4.0604	4.1216	4.1836	4.2465	4.3101
5	5.1010	5.2040	5.3091	5.4163	5.5256
6	6.1520	6.3081	6.4684	6.6330	6.8019
7	7.2135	7.4343	7.6625	7.8983	8.1420
8	8.2857	8.5830	8.8923	9.2142	9.5491

- (i) What would be the future value of a \$5000 per year annuity at 3% per annum for 6 years, with interest compounding yearly? 1
- (ii) What is the value of an annuity that would provide a future value of \$407 100 after 7 years at 5% per annum compound interest? 1
- (iii) An annuity of \$1000 per quarter is invested at 4% per annum, compounded quarterly for 2 years. What will be the amount of interest earned? 3